

What is claimed is:

1. A fluorinated carbon fiber comprising a coaxial
stacking morphology of truncated conical tubular graphene
layers,

wherein each of the truncated conical tubular graphene
layers includes a hexagonal carbon layer and has a large ring
end at one end and a small ring end at the other end in an axial
direction,

wherein at least part of edges of the hexagonal carbon
layers is exposed at the large ring ends, and

wherein the exposed edges of the hexagonal carbon layers
are fluorinated and have a structure shown by C_xF_y .

2. The fluorinated carbon fiber as defined in claim 1,

wherein at least part of edges of the hexagonal carbon
layers is exposed at the small ring ends.

3. The fluorinated carbon fiber as defined in claim 2,

wherein the coaxial stacking morphology of the truncated
conical tubular graphene layers is vapor grown,

wherein at least part of the large and small ring ends is
exposed by removing a deposited film formed during the vapor
growth.

4. The fluorinated carbon fiber as defined in claim 1,

wherein the coaxial stacking morphology of the truncated

conical tubular graphene layers has a shape of a hollow core with no bridge.

5 5. The fluorinated carbon fiber as defined in claim 1,
 wherein an outer surface of the fluorinated carbon fiber
is formed of the large ring ends stacked in the axial direction,
and

 wherein exposed part of the edges of the hexagonal carbon
layers has an area equal to or more than 2 percentages of an
10 area of the outer surface.

 6. The fluorinated carbon fiber as defined in claim 1,
 wherein an inner surface of the fluorinated carbon fiber
is formed of the small ring ends stacked in the axial direction,
15 and

 wherein the edges of the hexagonal carbon layers are
exposed on the inner surface.

 7. An active material for battery comprising the
20 fluorinated carbon fiber as defined in claim 1 at least in part.

 8. A solid lubricant comprising the fluorinated carbon
fiber as defined in claim 1 in part.